SUCTION-TYPE CONVEYOR DRUM FOR WEB TREATMENT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is the US national phase of PCT application PCT/EP2004/052842 filed 8 November 2004 with a claim to the priority of German patent application 10353115.7 itself filed 12 November 2003, whose entire disclosure are herewith incorporated by reference.

FIELD OF THE INVENTION

The invention pertains to a device for the flow-through treatment of textile materials, formed fabrics or paper by means of a gaseous or liquid treatment medium that is circulated in the device. A perforated or foraminous cylindrical drum is provided with end plates has an interior that is subjected to suction. The cylindrical drum serves as a conveyor element and its outer surface is covered with a wire mesh. Sheet-metal strips extend between the end plates of the cylindrical drum straight from one end plate to the other end plate and their width extends radially. Connecting elements are arranged between the sheet-metal strips and uniformly distributed over the length of the cylindrical drum. These connecting elements have a width that corresponds to the nominal distance or spacing between two directly adjacent sheet-metal strips and are rigidly connected to the adjacent sheet-metal strips. Each connecting element is formed as a thin bar and is provided with at least one bore extending angularly in the cylindrical drum in order to accommodate at least one screw and/or

a similar threaded fastening element, and can be connected to the two adjacent sheet-metal strips or connecting elements.

A device of this type is known from EP-A-0 315 961 (US equivalents 4,811,574 and 4,912,945). It has the unsurpassed advantage of a very high air permeability that is achieved without reducing the stability of the cylindrical drum. The angularly extending connecting elements are rigidly connected all around the cylindrical drum to the sheet-metal strips extending the length of the cylindrical drum by means of the provided screw connection such that a welded construction is not required. This makes it possible to eliminate the disadvantageous structural changes in the metal that occur when the otherwise required welding seams are produced.

The connecting elements according to EP-A-0 315 961 only have a wall thickness that is sufficient for their stability. This is the reason why they are formed as solid bars that are somewhat thicker in the region of the screws than in the central region in order to accommodate the screws. It was determined in practical applications that fouling occurred at the transitions from the walls to the central region at the level of the screws, as well as at other locations. Lint accumulated on the connecting elements and impaired the flow-through effect.

OBJECT OF THE INVENTION

The invention is based on the object of developing a construction, in which not only fouling of the connecting elements is eliminated, but the flow-through effect is even advantageously improved.

SUMMARY OF THE INVENTION

Based on the device according to EP-A-O 315 961, this object is attained in that the connecting element is shaped in a flow-promoting fashion over at least part of its radial length. This can be realized by designing each of the radially directed edges of the connecting elements in the shape of an arrow. The connecting element then extends with this width radially inward to the radially inner screw and is then once again advantageously arrow-shaped. Between the screws, the width of the body is only of insignificant stability-related importance such that the body can be realized in a hollow fashion at this location for weight reasons.

BRIEF DESCRIPTION OF THE DRAWING

A device according to the invention is illustrated in an exemplary fashion in the figures. Therein:

FIG. 1 is a section through a conventional perforated cylindrical drum, the sleeve of which consists of a strip-shaped sheet-metal structure with an outer wire mesh;

FIG. 2 is an enlarged axial section analogous to FIG. 1 through the sleeve of the prior-art perforated cylindrical drum;

FIG. 3 is an analogous enlarged section through a novel connecting element, and

FIG. 4 shows the connecting element according to FIG. 3 in a section that extends perpendicular to that shown in FIG. 3.

SPECIFIC DESCRIPTION

The perforated cylindrical drum according to FIG. 1 corresponds, e.g., to that disclosed in EP-A-0 315 961. The application hereby refers to the disclosure of this publication.

A perforated cylindrical drum essentially consists of an approximately rectangular housing 1 that is subdivided into a treatment chamber 3 and a fan chamber 4 by means of an intermediate wall 2. The perforated cylinder 5 is rotatably supported in the treatment chamber 3 on an axis A, and a fan 6 is rotatably supported coaxially therewith in the fan chamber 4. Naturally, the fan chamber 4 may also be in an unillustrated fan housing that is separate from the perforated cylinder housing 1. In any case, the fan 6 subjects the interior of the cylinder 5 to suction. This system can also be applied to a cylinder construction for a wet treatment device that may merely serve for removing liquid by suction. The entire construction needs to be adapted accordingly in this case.

According to FIG. 1, heating units 7 are arranged above and underneath the fan 6. The heating units 7 consist of pipes through which a heating medium flows. In the region that is not covered by a textile material 9, the perforated cylinder 5 is internally protected from the suction by means of an inner cover 8. The effective skin of the perforated cylinder is formed by the sheet-metal strip structure according to FIG. 2 that is described further below. The outside of this sheet-metal strip structure is covered by a fine-meshed screen 19 that is held under tension on the face of the cylinder on the two end plates 11, 12.

The known sheet-metal strip structure consists of axially extending sheet-metal strips 10, the radially extending extent of which is shown in FIG. 2. Therefore, the screen-like cover 19 only lies on the radially outer edges of the sheet-metal strips 10. The

sheet-metal strips 10 are fixed on the two end plates 11, 12 at a defined distance from one another by means of unillustrated screws. In order to fix this spacing over the width of the cylinder, connecting elements are provided that serve as spacers and are identified as a whole at 20, the connecting elements being connected to the sheet-metal strips 10 by means of screws 29, 29' and 30, 30'.

According to FIG. 2, the connecting elements 20 each have a rectangular flange 22 at their surfaces that contact the sheet-metal strip 10. The radially outer region of the connecting element 20 consists of a web 24. The connecting element 20 also has a radially inner widened leg 28 while the remaining region of the connecting element is realized with a narrow cross section except at the level of openings 25, 27 for accommodating the screws. The connecting elements 20 are connected together by rods 29, 29' and 30, 30' that are provided with threads at least on their two ends so that nuts 31 subsequently can be screwed onto these threaded ends within a connecting element 20'.

The novel connecting element 20" according to FIGS. 3 and 4 is realized in an altogether streamlined fashion in its radial direction. It has a radially oppositely directed sharp edges 34, 35 that offers less resistance to the fluid flowing past the connecting element 20" on its two ends that are provided with the bores 32, 33. Between the region at the level of the bores 32, 33, the width of the connecting element 20" remains unchanged, namely in accordance with the width required for the bores 34, 35. Due to

this shape of the connecting element 20", it no longer has an edge or groove that could be a cause for fouling.

In order to reduce the weight, the central region of the connecting element 20" is hollowed out to form a chamber 36, the walls 37, 38 of which are only sufficiently thick for the stability and extend parallel to one another with uniform thickness.

The cross-sectional width of the walls 37, 38 at the level of the hollow chamber 36 also corresponds approximately to the width of the walls at the level of the bores 32, 33 as illustrated in FIG. 4.

The connecting element 20" according to FIGS. 3, 4 is cast in one piece from metal. The only subsequent processing required are the bores 32, 33. The individual screws 29, 30 each have one end formed with an internal thread and an opposite end formed with an external thread that fit into the internal thread so they can be connected into a circle around the cylinder to form a so-called lock in at least one location. The required through bolt has a larger diameter at least in this one location. The connecting element 20" according to FIG. 3 is no longer usable. In order to attain the above-described object, the connecting element may merely consist at this location of an arrow-shaped piece of bent sheet-metal having the same wall thickness as the walls 37, 38, but is otherwise made hollow to accommodate the lock.